Safety-Related Working Practices

Office of Human Resources
Revised: January 2005

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Overview

The Occupational Safety and Health Act of N.C. (OSHANC) was signed into law in 1973 – the North Carolina OSHA Plan is required to be as effective as the federal OSHA and monitored by Federal OSHA to ensure that it remains as effective.

Occupational safety and health standards are enforced by the Division of Occupational Safety (DOSH) within the North Carolina Department of Labor. Standards enforced by DOSH provide employees in North Carolina the same protection as they would receive under standards enforced by federal OSHA. Additionally, standards related to the particular needs of our state are enforced to help ensure the effectiveness of our state's OSHA plan.

It is the intent of Southwestern Community College to provide a safe working environment and to adhere to all applicable safety standards.

General

Hazardous conditions or practices not covered in an OSHA standard may be covered under Section 5 of the Occupational Safety and Health Act of 1970 which states:

Employer Responsibilities
Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.

Employee Responsibilities
Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

Southwestern Community College shall initiate and maintain such programs as may be necessary to provide for frequent and regular inspections of the job site, materials, equipment, and procedures.

Southwestern Community College shall instruct each employee in the recognition and avoidance of unsafe conditions and unsafe actions in the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.

The Southwestern Community College Safety Related Working Practices and the Emergency Guidelines will be evaluated annually be the Director of Human Resources and Facility Development.

The Southwestern Community College Safety Related Working Practices and Emergency Guidelines will be available to all employees via the college website.

Accident Reporting and Recordkeeping

All accidents and injuries are to be reported to the Office of Human Resources. Southwestern Community College will maintain a log and summary (OSHA Form No. 300) of all recordable injuries and illnesses (resulting in a fatality, hospitalization, lost work days, medical treatment, job transfers or termination, or loss of consciousness).

At the end of each calendar year, Southwestern Community College will review the OSHA Form No. 300 and create an annual summary of injuries and illnesses recorded on the OSHA Form No. 300. This summary will be put on OSHA Form No. 300-A. This summary will be posted no later than February 1 of the year followed by the year covered by the records and kept posted until April 30.

In addition to the log of occupational injuries and illnesses, Southwestern Community College will have a supplementary record (OSHA Form No. 301) for each occupational injury or illness. Details of occupational injuries such as cuts, fractures, sprains, amputations, etc., or occupational illness, such as skin disorders, carbon monoxide, insecticide or chemical poisoning, etc., which fall under the definition of recordable accidents or illnesses must also be recorded on OSHA Form No. 301.

Walking and Working Surfaces

Walking and working surfaces include items as floors, stairs, ladders, and scaffolds. It is necessary that all areas such as storage closets, equipment rooms, shops, service rooms, passageways, etc. are kept clean and orderly.

All floor surfaces shall be kept clean, dry, and free from protruding nails, splinters, loose boards, holes or projections.

Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats or other dry standing places shall be provided where practicable.

Floors in buildings used for storage purposes shall be posted to show maximum safe floor loads.

Guarding Floor and Wall Openings and Holes
Every stairway and ladderway floor opening shall be guarded by a standard railing with standard toeboard on all exposed sides except at the entrance. For infrequently used stairways the guard may consist of a hinged cover and removable standard railings. The entrance to ladderway openings will be guarded to prevent a person walking directly into the opening.

Every hatchway and chute floor opening shall be guarded by a hinged floor opening cover equipped with standard railings to leave only one exposed side or a removable railing with toeboard on not more than two sides and fixed standard railing with toeboards on all other exposed sides.

Every floor hole into which persons can accidentally walk shall be guarded by either a standard railing with standard toeboard on all exposed sides, or a floor hole cover that should be hinged in place. While the cover is not in place, the floor hole shall be attended or shall be protected by removable standard railing.

Every open-sided floor, platform or runway four feet or more above adjacent floor or ground level shall be guarded by a standard railing with toeboard on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder. Runways not less than 18 inches wide used exclusively for special purposes may have the railing on one side omitted where operating conditions necessitate.

Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment shall be guarded with a standard railing and toeboard. Any elevated walkways or floor openings over four feet above the ground must be equipped with railings (42" high with intermediate rail) and four inch high toeboards. A loading dock for a cafeteria or maintenance shop might fall under this requirement. However, if routinely utilized, it would not have to be guarded.

Railings

A standard railing shall consist of top rail, intermediate rail and posts, and shall have a vertical height of 42 inches from upper surface to top rail, platform, etc.

A railing for open-sided floors, platforms, and runways shall have a toeboard whenever, beneath the open side, persons can pass, there is moving machinery of there is equipment with which falling materials could cause a hazard.

Railings shall be of such construction that the complete structure shall be capable of withstanding a load of at least 200 pounds in any direction on any point on the top rail.

A stair railing shall be of construction similar to a standard railing, but the vertical height shall be about 34 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

Railings must be put on all open stairways. If stairways are greater than 88 inches in width, an intermediate stair rail is required approximately midway of the width. Typical installations are included in accompanying figures.

Toeboards

Railings protecting floor openings, platforms, scaffolds, etc., shall be equipped with toeboards wherever, beneath the open side, persons can pass, there is moving machinery or there is equipment with which falling material could cause a hazard.

A standard toeboard shall be at least four inches in height, and may be of any substantial material either solid or open, with openings not to exceed one inch in greatest dimension.

Wall Openings

Wall openings, from which there is a drop of more than four feet, and the bottom of the opening is less than three feet above the working surface, shall be guarded.

When the height and placement of the opening in relation to the working surface is such that a standard rail or intermediate rail will effectively reduce the danger of falling, one or both shall be provided.

The bottom of a wall opening, which is less than four inches above the working surface, shall be protected by a standard toeboard or an enclosing screen.

Stairs

Every flight of stairs having four or more rises shall be equipped with the standard stair railings or standard handrails as specified below. On stairways less than 44 inches wide having one side open, there shall be at least one stair railing on the open side.

One the stairways less than 44 inches wide having both side open, one stair railing on each side.

On stairways more than 44 inches wide, but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side.

On all structures 20 feet or over in height, stairways, ladders, or ramps shall be provided.

Rise height and tread width shall be uniform throughout any flight of stairs.

Hollow pan-type stairs shall be filled to the level of the nosing with solid material.

Stairs, Fixed Industrial

Every flight of stairs having four or more risers shall be provided with a standard railing on all open sides. Handrails shall be provided on at least one side of closed stairways; preferably on the right side descending.

Stairs shall be constructed so the rise height and tread width is uniform throughout. Fixed stairways shall have a minimum width of 22 inches.

Fixed stairways shall be provided for access from one structure to another where operations necessitate regular travel between levels, and for access to operating platforms at any equipment which requires attention routinely during operations. Fixed stairs shall also be provided where access to elevations is daily or at each shift where such work may expose employees to harmful substances or for which purposes the carrying of tools or equipment by hand is normally required.

Spiral stairways shall not be permitted except for special limited usage and secondary situations where it is not practical to provide a conventional stairway.

Ladders

The use of ladders with broken or missing rungs or steps, broken or split side rails, or with other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall immediately be withdrawn from service.

Portable ladders shall be placed on a substantial base at a 4-1 pitch, have clear access at top and bottom, extend a minimum of 36 inches above the landing, or where not practical, be provided with grab railings and be secured against movement while in use.

Portable metal ladders shall not be used for electrical work or where they may contact electrical conductors.

Job-made ladders shall be constructed for their intended use. Cleats shall be inset into side rails ½ inch or filler blocks used. Cleats shall be uniformly spaced, 12 inches, top-to-top.

Except where either permanent or temporary stairways or suitable ramps or runways are provided, ladders shall be used to give safe access to all elevations.

General Rules to Follow in Proper Use of Ladders

Inspect ladder before use to determine that it is in good condition. Portable run ladders should be placed so that the horizontal distance from the top support to the foot of the ladder is about one quarter the working length.

The ladder should be placed on a suitable surface to prevent slipping. Be sure ladder is equipped with non-slip feet.

Do not use ladders in a horizontal position as a bridge or walking surface. Do not place ladders in front of door openings unless provisions are made to ensure that there is no traffic through the door. Do not place ladders on boxes, tables, or other unstable bases to obtain additional height.

Always ascend and descend a ladder facing the rungs. Use only wood or fiberglass ladders when working around power lines. If a ladder is used to gain access to a roof, it should extend at least three feet above the point of support.

Adjust extension ladders at base of ladder so that observation can be made of proper engagement of locks. Extension ladders should always be erected so that the upper section is resting on the bottom section. Do not allow more that one person on a ladder simultaneously.

Portable Ladders

Step ladders shall be equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in open position.

Ladders shall be inspected frequently and those which have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

Non self-support ladders shall be erected on a sound base with the base of ladders a distance from the wall or upper support equal to one quarter the length of the ladder, and placed to prevent slipping.

In general industrial use, portable metal ladders may be used in areas containing electrical circuits, if proper safety measures are taken.

Requirements for Portable Ladders

- Step ladders should be twenty feet or less in length. Straight ladders should be thirty feet or less in length.
- Two-section extension ladders longer than sixty feet are not allowed (no longer than 48 feet if metal).
- Steps or rungs must not be spaced any greater than twelve inches apart.
- Ladders must be equipped with no-slip feet.
- All ladders must be free from sharp edges, burrs, and other defects.

It is suggested that the top three rungs and top of portable ladders be painted red to indicate to employees that these steps should not be used to stand on.

CHECKLIST FOR LADDERS

Ladder Inspection to be conducted by Coordinator of Building and Grounds on an annual basis

Employees should visually inspect the ladder before each use

Date _____

ITEMS TO BE CHECKED	Good Condition	Action Taken	
		Repaired	Replaced
GENERAL	**Check each item**		
Loose steps or rungs (considered loose if can move by hand)			
Loose nails, screw, bolts, or other parts			
Cracked, split or broken uprights, braces, steps, or rungs. Slivers on uprights, rungs or steps.			
Damaged or worn no-slip shoes			
STEP LADDERS			
Wobbly (from side strain)			
Loose or bent hinge spreaders			
Stop on hinge spreaders broken			
Broken, split or worn steps and side rails			
Loose hinges			
Other damaged hardware			
EXTENSION LADDERS			
Loose, broken or missing extension locks			
Defective locks that do not seat properly when ladder is extended			
Deterioration of			
Top 3 rungs and side rails to be painted red (personnel shall not stand on top 3 rungs)			
STORAGE			
Storage space should be kept free of obstructions and accessible at all times, so ladders can be available at all times for emergencies.			

Scaffolds
Scaffolds shall be erected on sound, rigid footing, capable of carrying the maximum intended load without settling or displacement. Scaffolds and their components shall be capable of supporting, without failure, at least four times the maximum intended load.

Guardrails and toeboards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor except needle beam scaffolds and floats. Scaffolds four feet to ten feet in height, having a minimum dimension in either direction of less than 45 inches, shall have standard guardrails installed on all open sides and ends of the platforms.

There shall be a screen with a maximum ½ inch opening between the toeboard and the guardrail, where the persons are required to work or pass under the scaffold.

All planking shall be scaffold grade or equivalent as recognized by approved grading rules for the species of wood used.

The maximum permissible spans for 2 x 10 inches or wider planks are shown in the following table:

Material

	Full Thickness Undressed Lumber			Nominal Thickness Lumber	
Working load (p.s.f)	25	50	75	25	50
Permissible span (ft.)	10	8	6	8	6

The maximum permissible span for 1 ¼ x 9 inch or wider plank of full thickness is four feet, with medium loading of 50 p.s.f.

Scaffold planking shall be overlapped a minimum of 12 inches or secured from movement.

Scaffold planks shall extend over their end supports not less than six inches nor more than 12 inches.

All scaffolding and accessories shall have any defective parts immediately replaced or repaired. An access ladder or equivalent safe access shall be provided.

Mobile Scaffolds
Platforms shall be tightly planked for the full width of the scaffold except for necessary entrance opening. Platforms shall be secured in place.

Guardrails made of lumber, not less than 2 x 4 inches (or other material providing equivalent protection), approximately 42 inches high, with a midrail of 1 x 6 inch lumber (or other material providing equivalent protection), and toeboards, shall be installed at all open sides and ends on all scaffolds more than 10 feet above the ground or floor. Toeboards shall be a minimum of 4 inches in

heights. Where persons are required to work or pass under the scaffold, wire mesh shall be installed between the toeboard and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard wire ½ inch mesh, or the equivalent.

Tubular Welded Frame Scaffolds
Scaffolds shall be properly braced by cross-bracing or diagonal braces, both, for securing vertical members together laterally, and the cross braces shall be of such length as will automatically square and aline vertical members so that the erected scaffolds are always plumb , square, and rigid.

Concrete and Masonry Construction
No construction loads shall be placed on a concrete structure or portion of a concrete structure unless the supervisor determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.

All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement.

No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position.

To the extent practical, elevated concrete buckets shall be routed so that no employee, or the fewest number of employees, is exposed to the hazards associated with falling concrete buckets.

Form work shall be designed, fabricated, erected, supported, braced, and maintained so that is will be capable of supporting without failure all vertical and lateral loads that may reasonable be anticipated to be applied to the formwork.

Forms and shores (except those used for slabs on grade and slip forms) shall not be removed until the employer determines that the concrete has gained sufficient strength to support its weight and superimposed loads. Such determination shall be based on compliance with one of the following:

The plans and specifications stipulate conditions for removal of forms and shores, and such conditions have be followed, or the concrete has been properly tested with an appropriate American Society for Testing Materials (ASTM) standard test method designed to indicate the concrete has gained sufficient strength to support its weight and superimposed loads.

A limited access zone shall be established whenever a masonry wall is being constructed. The limited access zone shall conform to the following:

The limited access zone shall be established prior to the start of construction of the wall.

The limited access zone shall be equal to the height of the wall to be constructed plus four feet, and shall run the entire length of the wall.

The limited access zone shall be established on the side of the wall which will be unscaffolded.

The limited access zone shall be restricted to entry be employees actively engaged in constructing the wall. No other employees shall be permitted to enter the zone.

The limited access zone shall remain in place until the wall is adequately supported to prevent overturning and to prevent collapse unless the height of a wall is over eight feet, in which case, the limited access zone shall remain in place until the requirements above have been met.

All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent support elements of the structure are in place.

Grounds

College grounds are constantly being used by students, teachers, parents, and other employees. Signs should be posted to ensure safe movement of vehicular traffic, to warn of dangerous areas, and to inform the public of college regulations. All ground surfaces should be free of potholes, debris, and other tripping hazards. Driveways and sidewalks should be so designed as to provide easy access to unloading and parking areas to buildings. All maintenance activities such as back-hoe operations, insecticide spraying, and mowing should always make provisions for necessary safety apparatus. (See Checklist for Grounds).

CHECKLIST FOR GROUNDS

Yes ✓	Item	No✓	Notes
	All dead limbs are picked up and dead trees have been removed from grounds		
	Potholes have been filled.		
	Broken glass, litter, and debris have been picked up.		
	Insecticides and herbicides apply with state and federal regulations, and spraying activities are under supervision of licensed operator – all products approved by E.P.A.		
	All driveways, sidewalks, steps and play areas are in good state of repair		
	Fences are in good condition – do not present a hazard to students or employees.		
	Grounds are free of poisonous plants.		
	Traffic and regulatory signs are posted.		
	Grounds are properly drained – all storm drain covers are in place.		
	Outside electrical wiring and equipment is installed in accordance with National Electrical Code.		
	When maintenance activities are performed on the grounds, necessary barricades or other safety devices are installed.		
	Transformer vaults with exposed live parts are fenced and otherwise well-guarded.		

Means of Egress

Means of egress include all of the vertical or horizontal means of travel from any point in a building to a public way. It may include room space, doorway, corridor, stairs, ramp, halls, lobby, or any other path of travel. Since one means of egress may be obstructed or cut off by fire or smoke, one alternate means of egress is required, remote from the first. The only exception is in buildings or rooms so small and so arranged that a second exit would not provide an appreciable increase in safety. Generally in a school, a room built to hold over 50 people, or over 1,000 square feet of floor space, is required to have two exits.

The exit access, which is the path of travel to the exit, must be kept clear of obstructions and not used for storage area. It must be clearly marked by easily distinguishable exit signs and the travel distance should not be more than 150 feet. If the building has a sprinkler system the distance may be increased to 200 feet. The exit discharge, which is the portion of travel between the termination of the exit and a public way, must be free of obstructions such as trash cans, storage, and parked vehicles.

Every building or structure shall be provided with exits of kinds, numbers, location, and capacity appropriate to the individual building or structure, with due regard to the character of the occupancy, the number of persons exposed, the fire protection available, and the height and type of construction of the building or structure, to afford all occupants convenient facilities for escape.

(See Checklist for Fire Exits following this section).

Exits

Every building designed for human occupancy shall be provided with exits sufficient to permit the prompt escape of occupants in care of emergency.

In hazardous areas, or where employees may be endangered by the blocking of any single means of egress due to fire or smoke, there shall be at least two means of egress remote from each other.

Exits and the way of approach and travel from exits shall be maintained so that they are unobstructed and are accessible at all times.

All exits shall discharge to the street or other open space that gives safe access to a public way. Exit doors serving more than 50 people, or at high hazard areas, shall swing in the direction of exit travel.

Exit Signs

Every required exit shall be marked by a readily visible sign. Access to exits shall be marked by readily visible signs in all cases where the exit, or way to reach it, is not immediately visible to the occupants.

Any door, passage, or stairway which is neither an exit not a way of exit access and is located or arranged as to be likely mistaken for an exit, shall be identified by a sign reading “NOT AN EXIT”

or similar designation, or shall be identified by sign indicating its actual character, such as "TO BASEMENT," "STOREROOM," "LINEN CLOSET," or the like.

Exits shall be marked by readily visible, suitably illuminated exit signs. Exit signs shall be distinctive in color and provide contrast with surroundings. The work "EXIT" shall be of plainly legible letters, not less than six inches high.

No decorations, furnishings, or equipment which impair visibility of an exit sign shall be permitted, nor shall there be any brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision to the required exit sign of such a character as to so detract attention from the exit sign that it may not be noticed.

Doors

An exit door shall be of the swinging type. It shall swing with exit travel except when serving a room having a population of not more than 50 persons, provided there are no high hazard contents. A door giving access to a stairway shall swing in the direction of exit travel. A door during its swing shall not block stairs of landings, and in no case in new buildings shall any door at any point in its swing reduce the effective width of stair of landing to less than 22 inches, not when open interfere with the full use of the stairs. An exit door shall be so arranged as to be readily opened from the side from which egress is to be made at all times when the building served is occupied. Locks, if provided, shall not require the use of a key for operation from the inside of the building.

A door designed to be kept normally closed in a means of egress, such as a door to a stair enclosure or horizontal exit, shall be provided with a reliable self-closing mechanism, and shall not at any time be secured in the open position except where permitted elsewhere in NFPA 101. No lock, padlock, hasp, bar, chain, other device or combination thereof, shall be installed or maintained at any time on or in connection with any door on which panic hardware is required by NFPA 101 if such device prevents, or is intended to prevent, the free use of the door for exit purposes.

Stairs

Exit stairs should be arranged to minimize the danger of falling, as one person falling on a stairway may result in the complete blocking of an exit. Stairs should be wide enough so that two people can descend side by side; thus a reasonable rate of evacuation may be maintained, even though aged or infirm persons may slow the travel on one side. There should be no sudden decrease in width along the path of travel; this may create congestion or, in a panic rush, a solid wedge of bodies blocking the exit.

Steep stairs are dangerous. Treads should be wide enough to give good footing. There should be no winding stair treads. Landings should be provided to break up any excessively long individual flights. Good railings make for safer use of stairs, and stairs of unusual width should have one or more center rails. Specifications determining whether or not additional railings are necessary may be found in NFPA 101, Chapter 5. Every flight of stairs having four or more risers shall be equipped with standard stair rails and hand rails. There must be at least one hand rail for stairs less than 44 inches wide and two hand rails for stairs over 44 inches wide.

Fire Escape Stairs, Ladders, and Slide Escapes

Fire escapes should be stairs, not ladders. Their principle use is to correct exit deficiencies of existing buildings. Fire escape stairs should extend to the street of ground level. Swinging stair sections designed to swing down with the weight of a person, may be used for the lowest flight of the fire escape stair.

Access to fire escapers should preferably be through doors leading from the main building area or from corridors, never through rooms where doors may be looked. Fire escape stairs may be used as required means of exit only in existing buildings, subject to the provisions of the occupancy chapter applying. Fire escape stairs shall not constitute more than fifty percent of the required exit capacity in any case. Fire escape stairs shall not be accepted as constituting any part of the required exits for new buildings.

CHECKLIST FOR FIRE EXITS

Yes✓	Item	No✓	Notes
	All corridors, exit ways, stairways, and fire escapes are free of obstructions.		
	All exit doors are working properly.		
	All exit doors are unlocked and readily usable.		
	All exit doors swing in the direction of the exit.		
	No exit doors or fire doors have missing or broken windows.		
	All automatic fire doors are in working order.		
	No fire doors are propped open.		
	The panic hardware mechanism on the exit door functions properly.		
	There are no missing or loose handrails.		
	Stair treads and risers are in good condition.		
	Exit lights are in proper working order.		
	Fire drills are held monthly.		
	All fire extinguishers are correctly located.		
	All fire extinguishers have been inspected and tagged as required (monthly visual and annual recharge).		
	There are two means of egress from all areas of the building.		

Please note hazards or items needing attention:

Signature of SCC Personnel Conducting Inspection:	
Facility Inspected:	
Date of Inspection:	

Occupational Health

Occupational Health Hazards
OSHA requires a healthy place to work for all employees: instructors, office workers, custodial workers, and all others. While OHSA regulations are intended for the safety of employees, the safe environment created will be beneficial to students as well. Southwestern Community College is responsible for regulating physical stresses and chemical agents that pose health risks.

Physical stresses in the work environment might include insufficient light, too much noise, microwaves, x-rays, dust, laser beams, and asbestos exposure.

Chemical agents may be found in laboratories, cleaning compounds, building projects, vocational training shops and classes, water treating systems (Swain Center), maintenance shops, and others. Instructional, maintenance, and administrative personnel should regularly inspect for hazardous conditions. It is impossible to cover all the probable health hazards in school situations.

Personal Protective Equipment

Proper personal protective equipment, including shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition where there is a hazard from processes or environment that may cause injury or illness to the employee.

Southwestern Community College requires the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions or where the need is indicated for using such equipment to reduce the hazard to the employee(s).

Eye and face protection shall be provided when machines or operations present potential eye or face injury.

Suitable respirators selected on the basis of hazard to which the worker is exposed shall be provided by Southwestern Community College as necessary to protect the health of the workers. Southwestern Community College will provide respiratory mask fit test where appropriate.

Both the supervisors and the employees shall be properly instructed in the selection, use and maintenance of respirators.

Respirators shall be regularly cleaned and disinfected, and shall be inspected during cleaning. Deteriorating parts shall be replaced. Respirators for emergency use shall be inspected at least once a month and after each use. When not in use, respirators shall be stored in a convenient, clean, and sanitary location.

Head protective equipment (helmets) shall be worn in areas where there is a possible danger of head injuries from impact, flying or falling objects, or electrical shock and burns.

Hearing protection is required whenever it is impossible to engineer out undesirable or injurious noise levels. An effective hearing conservation program must be maintained for employees exposed to a weighted 8 hour average of 85 decibels or more. Additionally, employees operating power equipment, even for short duration, are encouraged to wear hearing protection.

General Environmental Controls

Signs
The college is responsible for setting up signs to control traffic flow around its facilities and to provide information relative to hazardous areas and regulations

Safety Color Coding
The following color scheme is recommended by OSHA:

RED – Fire protection equipment such as fire alarm boxes, fire blanket boxes, fire extinguishers, fire hose connection, fire pumps, fire hydrants, and sprinkler piping. Danger indications such as flammable liquid storage cans, barricade lights, and danger signs. Emergency stop bars or switches on hazardous machinery. Also can denote biohazards such as medical wastes and sharps.

ORANGE – The basic color for designating dangerous parts or machines or energized equipment.

YELLOW – The basic color for designating caution.

GREEN – The basic color for designating safety.

BLUE – Denotes caution, limited to warning against starting or use of equipment under repair.

PURPLE – Radiation hazards.

BLACK AND WHITE – Basic colors for identification of traffic and housekeeping markings.

FLOURESCENT ORANGE OR ORANGE RED – Biological hazard.

Accident Prevention Tags
A device usually made of card, paper pasteboard, plastic or other material used to identify a hazardous condition, used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment, or operations which are out of the ordinary.

Housekeeping
Correction of housekeeping problems will eliminate considerable numbers of hazards around the college. The custodial personnel have responsibility in assuring that corridors, stairs, aisles, shelves, and walking surfaces are kept clean and clear of obstacles. When broken or damaged items such as

stair treads, handrails, guardrails, doors, floors, discharged fire extinguishers, and sidewalks are noticed, these should immediately be reported to the maintenance department.

If floors are scrubbed during college hours, signs such as "WET FLOORS" should be displayed. Housekeeping should always be practiced in such a way that hazards to both employees and students are avoided.

Form and scrap lumber with protruding nails and all other debris, shall be kept clear from all work areas. Combustible scrap and debris shall be removed at regular intervals.

Containers shall be provided for collection and separation of all refuse. Covers shall be provided on containers used for flammable or harmful substances. Wastes shall be disposed of at frequent intervals.

All sweepings, solid or liquid wastes, refuse, and garbage shall be removed in such a manner as to avoid creating a menace to health and as often as necessary to maintain good sanitary conditions.

SAFETY CHECKLIST FOR CUSTODIAL DEPARTMENT

Item	Yes ✓	No ✓	Notes
Slippery floors			
Holes in floor			
Loose tile or carpet			
Litter on floors			
Loose handrails or handrails that should be refinished.			
Slivers, sharp, or protruding corners on handrails.			
Litter on stairs of landings.			
Loose, broken, worn, or slippery treads.			
A good design to ensure safety of operator			
Broken or cracked glass with jagged edges exposed.			
Loose latches, window locks, or handles.			
Missing or loose caulking around window panes.			
Arrangement of furniture and fixtures for an adequate passageway.			
Damaged rugs or rugs that stick up and can be tripped over.			
Doors that open hard or close too fast.			
Throw rugs that should be tacked down or a non-skid backing applied to them.			
Loose or projecting screws that may become accident hazards.			

SAFETY CHECKLIST FOR CUSTODIAL DEPARTMENT

Item	Yes ✓	No ✓	Notes
Proper placement of entrance mats or rugs.			
Broken or loose concrete in entrance area.			
Broken or loose concrete creating a trip hazard.			
Litter on walks.			
Guardrails have been installed where required.			
Proper storage of items such as heavy items on lower shelves.			
Splinters on wooden shelves and other wooden items.			
Shelving not properly fastened to wall, floor, or together.			
Improper storage of flammable and other hazardous materials.			
Extinguishers properly installed and charged.			
Fire drill plan showing route to take to evacuate building.			
Ladders have been checked to see that they meet OSHA Standards.			
Electrical extension cords are all continuous, are not damaged, and have 3-wire plugs.			
Proper grounding of electrical equipment.			
Loose handles and brushes on equipment.			

SAFETY CHECKLIST FOR CUSTODIAL DEPARTMENT

Item	Yes ✓	No ✓	Notes
Proper storage of replacement blades for knives and razors			
Proper labels on poisons and concentrated cleaning solutions.			
Proper and legible directions for use of strong chemicals.			
Proper clothing and hand care when using specific chemicals.			
Proper storage of paints, thinners, solvents, poisons, and gasoline.			
Proper guards and approved safety devices on mowers and trimmers.			
Proper clothing and footwear for grass mowing.			
Litter and obstructions in area to be mowed.			
Proper grounding of electrical trimmers.			
Custodial personnel have access to available safety equipment such as gloves or eye protection devices.			
Wooden handles of hammers, brooms, and other tools free of cracks and held tightly.			

SAFETY CHECKLIST FOR INSTRUCTIONAL AND OFFICE PERSONNEL

Item	Yes ✓	No ✓	Notes
Chairs are checked for the following:			
Proper tension of backrest.			
Chair adjusted for correct height.			
Condition of casters so that they will roll smoothly and easily.			
Any broken items that present a safety hazard.			
Maintenance items such as loose screws, faulty hinges, etc. that may become potential hazards.			
Desks are checked for the following:			
Slivers on wooden desks.			
Sharp, protruding objects on side of desk.			
Bulky items that should be kept will in from edge of desk.			
Filing cabinets have been checked for the following:			
Doors or drawers lest open when not in use.			
Heavy items stored in lower drawers.			
Defective drawer mechanism.			
Boxes, bookracks, papers stored on top of cabinets and lockers.			
Loose or defective parts.			
A file stool for filing in lower drawers.			
Hazardous housekeeping in cabinets and lockers.			
Splinters on wooden cabinets.			

SAFETY CHECKLIST FOR INSTRUCTIONAL AND OFFICE PERSONNEL

Item	Yes ✓	No ✓	Notes
Sharp edges on cabinets.			
Drawers on doors that will block aisles when open.			
Cabinets secured to floor, wall or other cabinets to avoid tripping.			
Bookcases have been checked for the following:			
Items stored on top of bookcases.			
Broken glass windows and doors.			
Loose or defective parts.			
Sharp edges.			
Clerical items have been checked as follows:			
Pointed and sharp items not properly stored in drawers.			
Small pointed objects, such as pins and thumbtacks, mixed with paper clips in small containers in desk drawers.			
Check paper cutter cutting arm spring tension.			
Pencils are not stored point up on desk.			
Business machines have been checked for the following:			
3-wire cord and plug on motor drive equipment if required.			
Cords that are damaged or worn.			
Typed-over defects in cordage.			

SAFETY CHECKLIST FOR INSTRUCTIONAL AND OFFICE PERSONNEL

Item	Yes ✓	No ✓	Notes
Electric fans have been checked as follows:			
Cords that are tripping hazards.			
Electric cords that are frayed..			
Guards covering blades (opening can be no longer than ½ inches).			
Telephone cords and cables have been checked for the following:			
Cords sticking out in front of desks or tables.			
Cords and cables lying hazardously on the floor.			
Are they trip hazard?			
Electrical cords have been checked for the following:			
Taped-over defects in cordage.			
Damaged and worn cords, especially at the point where the cord enters the equipment housing.			
Check for overloaded extension cords.			
Are they a trip hazard?			
Storage areas have been check for the following:			
Proper storage of items, such as heavy items, on lower shelves.			
Storage of flammable and other hazardous materials in approved cabinets. NOTE: Some printing supplies fall into this category.			
Sharp objects are not stored on high shelves.			
Splinters on wooden shelves.			

SAFETY CHECKLIST FOR INSTRUCTIONAL AND OFFICE PERSONNEL

Item	Yes ✓	No ✓	Notes
Shelving not properly fastened to wall, floor, or together.			
First aid kits installed.			
Fire extinguishers are available in accordance with NFPA standards in instruction and office areas.			
Laboratory classrooms have eye wash and shower available.			
All **ladders** must meet OSHA standards.			
Instructional and office personnel areas have been check in accordance with the housekeeping section of the Manual.			

SAFETY CHECKLIST FOR SHOP AREAS

No.	Item	Yes ✓	No ✓	Notes
1.	Woodworking equipment, grinders, compressors, fans, and other power equipment have guards installed. (If equipment is over seven feet above floor, it need not have guards).			
2.	Shop electrical equipment is grounded in accordance with N.E.C. 430-142-143, and disconnecting means is available in accordance with N.E.C. 430-100.			
3.	A push to start or stop control (magnetic) is available on equipment which, if restarted after a power failure, could result in injury to operator.			
4.	Operator can cut off shop equipment at the point of operation.			
5.	Portable motor operated tools, such as saws, are properly guarded and grounded. Portable tools may be double insulated (See Electrical Requirements section).			
6.	Safety glasses are worn when working with shop equipment such as woodworking equipment, sanders, and grinders.			
7.	Electrical wiring and equipment used in hazardous areas are in accordance with Electrical Requirements section of this manual.			
8.	Compressed air used for cleaning purposes around shop equipment is limited to 30 PSI. Compressed air safety rules are posted at each outlet.			
9.	All lawn mowers have guards installed in accordance with requirements of paragraph 1910.243(e) of the General Industry Standards.			

SAFETY CHECKLIST FOR SHOP AREAS

No.	Item	Yes ✓	No ✓	Notes
10.	Hand tools are in good condition – adjustable wrenches do not have sprung jaws – wedges and chisels are free of mushroom heads – wooden handles of tools are not cracked and are tight in the tool.			
11.	Stacking of pipe, lumber, and materials is done in a safe manner.			
12.	"No smoking" signs are posted in gas-dispensing areas, paint booths, automotive shops and other appropriate areas. Other signs are posted as necessary to warn of dangers or regulations.			
13.	All maintenance employees, bus mechanics, other shop employees, and students have, at their disposal, safety equipment such as eye and face protective devices, hard hats, gloves, protective clothing, safety shoes, electrical protective equipment, and hearing protective devices.			
14.	Noise levels have been engineered out of high decibel level equipment such as skill saws. If not feasible, hearing protection devices are available.			
15.	An effective hearing conservation program is in effect for personnel exposed to excessive noise.			
16.	Safety precautions are taken when welding as follows:			
	Equipment is checked to see if in good condition.			
	Welding is not done close to combustible materials (35 feet).			
	Protective equipment and clothing is utilized.			
	Ventilation is used, if required.			
	Arc welding equipment is of an approved low voltage design.			

SAFETY CHECKLIST FOR SHOP AREAS

No.	Item	Yes ✓	No ✓	Notes
17.	Portable gas cylinders used in welding operations, such as acetylene and oxygen, meet the following conditions:			
	Gas cylinders are legibly identified with gas contents.			
	All cylinders weighing over 30 pounds are equipped with a means of connecting a valve protection cap. Cap is on when not being used.			
	Cylinders are not stored near sources of heat			
	Acetylene tanks are stored with valve end up			
	Oxygen cylinders in storage are separated from fuel-gas cylinders by at least 20 feet.			
	Cylinders are secured when being transferred; tanks do not bang together; safety caps are on.			
	Gas cylinders are secured in a stand or by chains when stored.			
	Compressed gas valve connections comply with ANSI B57-1-1965.			
	All hoses used with cylinders are in good condition.			
18.	All ladders meet OSHA requirements.			
19.	First aid kits approved by a physician are available – at least one person is trained in first aid if medical assistance cannot be reach in fifteen minutes driving time.			
20.	Portable fire extinguisher equipment installed and currently inspected.			
21.	Overhead and gantry cranes, jacks, and loading equipment are marked with maximum safe loads.			

SAFETY CHECKLIST FOR SHOP AREAS

No.	Item	Yes ✓	No ✓	Notes
22.	All students have been given safety instructions.			
23.	Excavations and trenches are in accordance with requirements of Construction Industry Standards, Paragraph 1926.652.			
24.	Good housekeeping and sanitation are maintained in all areas – no oily floors, aisles are clear, equipment and materials are properly stored.			
25.	Eyewash facilities are provided in shop areas where there is a likelihood of hazardous chemical splashings. Battery charging areas would fall under this area.			
26.	Battery charging areas are not located in hazardous areas as defined by the N.E.C.			
27.	All maintenance vehicles have safety belts installed and employees have been instructed to use them. Vehicles have fire extinguisher installed (suggest 5-lb ABC type).			

Fire Protection

Fire Protection – General
Portable fire extinguishers suitable to the conditions and hazards involved shall be provided and maintained in an effective operating condition.

Portable fire extinguishers shall be conspicuously located and mounted where they will be readily accessible. Extinguishers shall not be obstructed or obscured from view. (Minimum of three feet and maximum of five feet from floor).

Portable fire extinguishers shall be given maintenance service at least once a year and a written record kept to show the maintenance or recharge date. A record shall be maintained of the service.

Where the college has provided portable fire extinguishers for employee use in the workplace, the college shall also provide an educational program to familiarize employees with the general principles of fire extinguishers used and the hazards involved with incipient stage fire fighting.

Fire Extinguishers
Many fires are small at origin and may be extinguished by the use of portable fire extinguishers. It is strongly recommended that the fire department be notified as soon as a fire is discovered. This alarm should not be delayed awaiting results of application of portable fire extinguishers. Fire extinguishers can represent an important segment of any overall fire protection program. However, their successful functioning depends upon the following conditions having been met:

- The extinguisher is properly located and in working order.
- The extinguisher is of proper type for a fire which may occur.
- The fire is discovered while still small enough for the extinguisher to be effective.
- The fire is discovered by a person ready, willing, and able to use the extinguisher. The use of a fire extinguisher(s) is voluntary.

The various types of fire extinguishers are not all equally effective on all kinds of fire; therefore, consideration shall be given to the class of fire which may occur and the nature of the processes or contents within a building. The basic types of fires are Classes A, B, C, and D, as defined in the following:

- "Class A fires" involve ordinary combustible materials, such as wood, cloth, paper, and rubber.
- "Class B fires" involve flammable liquids, gases and greases.
- "Class C fires" involve energized electrical equipment where the electrical non-conductivity of the extinguishing media is of importance.
- "Class D fires" involve in combustible metals such as magnesium or sodium which reach strongly or violently if the wrong class of fire extinguisher is used.

Since most all fires in school buildings fall into the Class A, B, and C type, the school buildings should be equipped with Class A, B, and C type fire extinguishers; therefore, very limited need of Class D type fire extinguishers are needed in school buildings.

There is available a multipurpose type for fire extinguisher which is suitable on Class A, B, and C type fires and is recommended for school buildings.

Machinery and Machine Guarding

Machines and Tool Guards
Machinery is required to be guarded to protect the operator and other employees in the machinery area from hazards such as those created by point of operation, ingoing nip points, rotating parts, and flying chips.

It is recommended, as far as possible, that guards on joiners, band saws, radial saws, etc. be purchased from manufacturers of the specific piece of equipment. The determination of proper guard for a particular piece of equipment is sometimes a very complicated procedure, and more often than not, it is cheaper to purchase, if available, than to design and make one. Also, situations where the guard might present more danger than the machine itself should be avoided. There is some equipment, such as compressor belts, for which guards can easily be made. Guards should always be in working order and used at all times.

Fixed Machinery
Machines designed for a fixed location shall be securely anchored to prevent walking or moving, or designed in such a manner that they will not move in normal operations.

Machine Guarding
The point-of-operation guarding device shall be so designed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

Special supplemental hand tools for placing and removing material shall permit handling of material without the operator placing a hand in the danger zone.

Some of the machines that usually require point-of-operation guarding are guillotine cutters, shears, alligator shears, power presses, milling machines, power saws, jointers, portable power tools, and forming rolls and calendars.

Power Transmission Equipment Guarding
Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise constitute a hazard.

All belts, pulleys, sprockets and chains, flywheels, shafting and shaft projections, gears, and couplings, or other rotating or reciprocating parts, or any portion thereof, within seven feet of the floor or working platform shall be effectively guarded.

All guards for inclined belts shall conform to the standards for construction of horizontal belts, and shall be arranged in such a manner that a minimum clearance of seven feet is maintained between the belt and floor at any point outside the guard.

Where both runs of horizontal belts are seven feet or less from the floor or working surface, the guard shall extend at least 15 inches above the belt.

Where gears require a guard, the guard shall extend six inches above the mesh point by a band guard covering the face, or be completely enclosed.

Couplings with bolts, nuts or set screws extending beyond the flange of the coupling shall be guarded by a safety sleeve.

Woodworking Machinery

General

All woodworking machinery such as table saws, swing saws, radial saws, jointers, tenoning machine, boring and mortising machines, shapers, planers, lathes, sanders, veneer cutters, and other miscellaneous woodworking machinery shall be effectively guarded to protect the operator and other employees from hazards inherent to their operation.

A power control device shall be provided on each machine to make it possible for the operator to cut off the power to the machine without leaving this position at the point operation.

Power controls and operating controls should be located within easy reach for the operator while he is at his regular work location, making it unnecessary for him to reach over the cutter to make adjustments. This does not apply to constant pressure controls used only for setup purposes.

Each operating treadle shall be protected against unexpected or accidental tripping. On applications where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power.

Table Saws

Circular table saws shall have a hood over the portion of the saw above the table, so mounted that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut.

Circular table saws shall have a spreader aligned with the blade, spaced no more than ½ inch behind the largest blade mounted in the saw. This provision does not apply when grooving, dadoing, or rabbeting.

Circular table saws used for ripping shall have non-kickback fingers or dogs.

Feed rolls and blades of self-feed circular saws shall be protected by a hood or guard to prevent the hands of the operator form coming in contact with the in-running rolls at any time.

Swing or Sliding Cut-Off Saws
All swing or sliding cut-off saws shall be provided with a hood that will completely enclose the upper half of the saw.

Limit stops shall be provided to prevent swing or sliding type cut-off saws from extended beyond the front or back edges of the table.

Each swing or sliding cut-off saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel.

Inverted sawing of sliding cut-off saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or material being cut.

Radial Saws
Radial saws shall have an upper guard which completely enclosed the upper half of the saw blade. The sides of the lower exposed portion of the blade shall be guarded by a device that will automatically adjust to the thickness of and remain in contact with the material being cut.

Radial saws used for ripping shall have non-kickback fingers or dogs. An adjustable stop shall be provided to prevent the forward travel of the blade beyond the position necessary to complete the cut in repetitive operations.

Radial saws shall be installed so that the cutting head will return to the starting position when released by the operator.

Band Saws
All portions of band saw blades shall be enclosed or guarded except for the working portion of the blade between the bottom of the guide rolls and the table.

Band saw wheels shall be fully encased. The outside periphery of the enclosure shall be solid. The front and back shall be either solid or wire mesh or perforated metal.

Jointers
Each hand-fed planer and jointer with a horizontal head shall be equipped with a cylindrical cutting head. The opening in the table shall be kept as small as possible.

Each hand-fed jointer with a horizontal head shall have an automatic guard which will cover the section of the head on the working side of the fence or cage.

A jointer guard shall automatically adjust itself to cover the unused portion of the head, and shall remain in contact with the material at all times.

Each hand fed jointer with horizontal cutting head shall have a guard which will cover the section of the head back of the cage or fence.

Belt Sanding Machines
Belt sanding machines shall be provided with guards at each nip point where the sanding belt runs onto a pulley. The unused run of the sanding belt shall be guarded against accidental contact.

Abrasive Wheel Machinery

All abrasive wheel bench and stand grinders shall be provided with safety guards which cover the spindle ends, nut and flange projections, and are strong enough to withstand the effects of a bursting wheel.

All abrasive wheels shall be closely inspected and ring-tested before mounting to ensure that they are free from defects.

Abrasive wheels shall be used only on machines provide with safety guards with the following exceptions:

- Wheels used for internal work while within the work being ground;
- Mounted wheels, used in portable operations, two inches and smaller in diameter; and
- Type 16, 17, 18, 18R, and 19 cones, plugs, and threaded hole pot balls where the work offers protection.

Abrasive wheel safety guards shall cover the spindle end, nut, and flange projections, except:

- Safety guards on all operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and outer flange are exposed;
- Where the nature of the work is such as to entirely cover the side of the wheel, and the side covers of the guard may be omitted; and
- The spindle end, nut, and outer flange may be exposed on machines designed as portable saws.

Abrasive wheel safety guards for bench and floor stands and for cylindrical grinders shall not expose the grinding wheel periphery for more than 65 degrees above the horizontal plane of the wheel spindle. The protecting member shall be adjustable for variations in wheel size so that the distance between the wheel periphery and adjustable tongue or end of the peripherals member at the top shall never exceed ¼ inch.

Machines designed for a fixed location shall be securely anchored to prevent movement, or designed in such a manner that in normal operation they will not move.

An adjustable work rest of rigid construction shall be used to support the work on the offhand grinding machines. Work rests shall be kept adjusted closely to the wheel with a maximum clearance of 1/8 inch.

Hand and Portable Powered Tools and Other Hand-held Equipment

Hand Tools – General
The college shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees. Employers shall not issue or permit the use of unsafe hand tools.

All hand tools shall be kept in sage condition. Handles of tools shall be kept tight in the tool, and wooden handles shall be free of splinters or cracks. Wedges, chisels, etc., shall be free of mushroomed heads. Wrenches shall not be used when sprung to the point that slippage occurs.

Electric power operated tools shall either be approved double-insulated, be properly grounded, or used with ground fault circuit interrupters.

The frames of portable electrical tools and equipment, except when U.L. approved double insulated construction, shall be properly grounded.

Electric powered tools and equipment showing worn, deteriorated, or inadequate insulation or other parts shall be removed from service and repaired or replaced.

Air Tools
Pneumatic power tolls shall be secured to the hose or whip in a positive manner to prevent accident disconnection.

Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled.

The manufacturer's sage operating pressure for all fittings shall no be exceeded.

All hoses exceeding ½ inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failures.

Use of Compressed Air
Compressed air used for cleaning purposes shall not exceed 30 psi when the nozzle end is obstructed or dead-ended, and then only with effective chip guarding and personal protective equipment.

The requirement does not apply to concrete form, mill scale and similar cleaning operations.

Chipguards
Effective chip guarding shall be provided, in operations involving cleaning with compressed air, to protect personnel against flying chips or other such hazards. (Effective guarding includes protective shields or barriers and/or personnel protective equipment.)

Portable Circular Saw
All portable power-driven circular saws having a blade diameter greater than two inches shall be equipped with guards above and below the base plate or shoe. The upper guards shall cover the saw to the depth of the teeth, except for the minimum arch required to permit the base plate to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically return to the covering position.

Portable Abrasive Wheels
Abrasive wheels shall be used only on machines provided with safety guards except for wheels used for internal work, mounted wheels used in portable operations two inches and smaller in diameter, and types 16, 27, 18, 18R and 19 cones, and plugs, and threaded hole pot balls where the work offers protection.

A safety guard shall cover the spindle end, nut and flange projections. The safety guard shall be mounted to as to maintain proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard except where the work provides a suitable measure of protection to the operator, of on portable machines designed for, and used with types 6, 11, 17, and 28 abrasive wheels, cutting off wheels, and tuck pointing wheels.

Safety guards used on machines known as right angle head or vertical portable grinders shall have a maximum exposure angle of 180 degrees, and the guard shall be located so as to be between the operator and the wheel during use. Adjustment of the guard shall be such that pieces of accidentally broken wheel will be deflected away for the operator.

Welding, Cutting and Brazing

General
Welding operations require that special safety precautions be taken. If proper protective equipment is not worn, eyesight can be permanently damaged, and there is always danger with burns. Welding should be done in booths to prevent possible eye damage to persons who happen to walk upon a welding operation. Protective eye gear with correct filter shades and helmet should be worn. Welding operations generate air contaminants such as ozone, carbon dioxide, carbon monoxide, and the oxides of nitrogen. Welding on painted items can generate injurious fumes. When welding, cutting, or brazing operations take place in closed areas or where normal ventilation is inadequate, mechanical ventilation should be provided. Respirators of approved type should be worn if required.

Welding General (see also Welding in Confined Spaces)
Welding equipment shall be chosen for safe application to the work and shall be installed properly. Employees designated to operate welding equipment shall be properly instructed and qualified to operate it.

Mechanical ventilation shall be provided when welding or cutting and there is less than 10,000 cubic feet per welder or the overhead height is less than 16 feet.

Proper shielding and eye protection to prevent exposure of personnel from welding hazards shall be provided. The welder shall be enclosed in a booth or non-combustible screening with a finish of low reflectivity with respect to visible and ultra-violet radiation.

Proper precautions (isolating welding and cutting, removing fire hazards from vicinity, providing a fire watch, etc.) for fire prevention shall be taken in areas where welding of other "hot work" is being done.

Work and electrode lead cables shall be frequently inspected. Cables with damaged insulation or exposed bare conductors shall be replaced.

No welding, cutting or heating shall be done where the application of flammable paints, or the presence of other flammable compound, or heavy dust concentrations creates a fire hazard.

Arc welding and cutting operations shall be shielded by noncombustible or flameproof shields to protect employees from direct arc rays.

When electrode holders are to be left unattended, the electrodes shall be removed and the holder shall be placed or protected so that they cannot make electrical contact with employees or conducting objects.

All arc welding and cutting cables shall be completely insulated and be capable of handling the maximum current required for the job. There shall be no repairs or splices within ten feet of the electrode holder, except where splices are insulated equal to the insulation of the cable. Defective cables shall be repaired or replaced.

Fuel gas and oxygen hose hall be easily distinguishable and shall not be interchangeable. Hoses shall be inspected at the beginning of each shift and shall be repaired or replaced if defective.

General mechanical or local exhaust ventilation or air line respirators shall be provided, as required, when welding, cutting or heating:

- zinc-, lead-, cadmium-, mercury-, or beryllium-bearing, based or coated materials in enclosed spaces
- stainless steel with inert-gas equipment
- in confined spaces
- where unusual conditions can cause and unsafe accumulation of contaminants

Proper eye protection equipment to prevent exposure of personnel shall be provided.

Welding in Confined Spaces (see also Confined Space Entry Program)
All welding and cutting operations carried on in confined spaces shall be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency.

In such circumstances where it is impossible to provide such ventilation, airline respirators or hose masks approved by the U.B. Bureau of Mines for this purpose shall be used.

In areas immediately hazardous to life, hose masks with blowers or self-contained breathing equipment shall be used. The breathing equipment shall be of a type approved by the U.S. Bureau of Mines.

Where welding operations are carried on in confined spaces and where welders and helpers are provided with hose masks, hose masks with blowers of self-contained breathing equipment, a worker shall be stationed on the outside of such confined spaces to ensure the safety of those working within. Oxygen shall never be used for ventilation.

Compressed Gases
The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tankcars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

Cylinders, Compressed Gas, Used in Welding
Compressed gas cylinders shall be kept away from excessive heat, shall not be stored where they might be damaged or knocked over by passing or falling objects, and shall be stored at least 20 feet away from highly combustible materials.

Where a cylinder is designed to accept a valve protection cap, caps shall be in place except when the cylinder is in use or is connected for use.

Acetylene cylinders shall be stored and used in a vertical, valve end-up position only.

Oxygen cylinders in storage shall be separated form fuel-gas cylinders or combustible materials (especially oil or grease) a minimum distance of 20 feet or by noncombustible barrier at least five feet high having a fire-resistance rating of at least one-half hour.

Boiler/Mechanical Rooms

Boilers
Boiler design and construction is covered by the Code of Fired Pressure Vessels, Section I, ASME Boiler and Pressure Vessel Code, 1968. The following are good practice procedures and might be incorporated into future OSHA standards.

Boiler inspection and approval, on an annual basis, by a recognized boiler inspection service is satisfactory evidence of acceptable installation and maintenance.

A valid boiler inspection certificate, bearing the signature of the authorized inspector and the date of the last inspection, shall be conspicuously posted.

All boilers shall be equipped with approved-type water column, gauge glass, and try cocks. Gauge glasses and water columns shall be guarded to prevent breakage.

An emergency shutdown procedure recommended by the boiler manufacturer or insurance underwriter shall be implemented when such a shutdown is required.

Mechanical Rooms – Heating, Air Conditioning, Electrical

Mechanical rooms include such equipment as electrical services to building, heating boilers, air conditioning equipment, water supplies, and other equipment necessary to make the college's physical plant function. Generally, these rooms designed to hold mechanical equipment are not to be used for storage space.

Obvious fire hazards, such as lawn mowers, trash, books, papers, chemicals, and gasoline cans should not be stored in these spaces. Other equipment such as vacuum cleaners, rakes and hedge clippers should not be stored around mechanical equipment.

Installation of safe controls on boilers and pressure devices in schools is insured through inspection by the North Carolina Department of labor or other authorized insurance inspectors every two years. Rules and regulations governing boilers and pressure vessels are outlined in the "Boiler Inspection Law – Rules and Regulations" which is available from the North Carolina Department of Labor. It is recommended that current pressure vessel and boiler certificates be kept in the mechanical equipment rooms where such equipment is located.

It is very important that custodians and other personnel required to operate mechanical rooms be thoroughly familiar with operating procedures.

SAFETY CHECKLIST FOR MECHANICAL ROOMS

No.	Item	Yes ✓	No ✓	Notes
1.	Boilers – daily check during heating season are made of the following: a) Blow-down valve is operating. b) Safety relief valve is open to ensure proper operation. c) Water feeder low water cut-off if operated. d) Pressure gauges are checked to ensure proper operation. e) Burner or stoker observed for proper operation.			
2.	Adequate ventilation and combustion air is supplied to mechanical room equipment.			
3.	Control switches for hazardous equipment, such as boilers, are located at room entrance door and painted red.			
4.	Mechanical rooms are clean and orderly, free of fire hazards, and not used for storage purposes.			
5.	All floor openings for items such as condensate pumps, and sump pump service tunnels, have covers installed. Guard rails are installed as required by OSHA regulations on stairs and floor openings.			
6.	All ladders used in equipment room meet OSHA regulations.			
7.	No fresh air intakes are installed where there is a possibility of bringing in hazardous fumes from heating or other equipment.			
8.	Floors are dry; mechanical rooms are not subject to moisture accumulation, creating greater electrical shock hazards or equipment failures.			
9.	All wiring is installed in accordance with the National Electrical Code. All electrical switches are clearly labeled as to use, (gutter and box covers are installed). High voltage areas are marked.			

SAFETY CHECKLIST FOR MECHANICAL ROOMS

No.	Item	Yes ✓	No ✓	Notes
10.	Portable fire extinguishers of proper type, size, and location are installed and currently inspected to assure a safe and charged condition.			
11.	All equipment installed below seven feet high, such as air compressors and fans, is properly guarded.			
12.	Persons required to operate mechanical equipment rooms have been trained and are aware of responsibilities.			
13.	Equipment operating instructions are posted in mechanical rooms.			
14.	Vents with adequate draft are installed and on fossil fuel burning equipment. Regularly scheduled checks are made of such equipment to see that they are properly adjusted.			
15.	No LP gas equipment is located in basement areas.			
16.	Hazards, such as low hanging pipes, are identified in a way to make them easily recognizable.			
17.	Required personnel safety equipment is always used when performing necessary maintenance and handling corrosive materials.			
18.	Fire fighting equipment is installed in accordance with applicable NFPA Codes.			
19.	Illumination is adequate in boiler room.			

Toxic and Hazardous Substances

An independent contractor, Blue Ridge Community College Environmental Health and Safety Institute, located in Flat Rock, North Carolina, conducts annual inventory and annual training for staff at Southwestern Community College. Copies of material relating to this topic are located in the Personnel Office.

All employees of the college have to be aware of toxic and hazardous substances. The college has contracted with an independent agency to conduct annual inspections, inventories and provide training for Southwestern Community College employees on hazard communications. Every chemical purchased by or stored in the college has an MSD sheet which is kept on file in the Maintenance Department. In addition, MSDS are kept at the location of the chemical to assist employees on the scene with first aid or emergency procedures. There are written plans on file for Hazard Communication, Chemical Hygiene, Bloodborne Pathogens and Exposure Control in the Personnel Office.